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INTERNATIONAL APPLICATION NO
PCT/DE00/02602INTERNATIONAL FILING DATE
03 August 2000PRIORITY DATE CLAIMED
10 August 1999

TITLE OF INVENTION

METHOD FOR PROVIDING A PERMANENTLY AVAILABLE NARROWBAND DATA LINK

APPLICANT(S) FOR DO/EO/US

Chandan Das et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☒ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☐ Other items or information:

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IN THE UNITED STATES ELECTED/DESIGNATED OFFICE
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UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

PRELIMINARY AMENDMENT

APPLICANTS: Chandan Das et al. DOCKET NO.: 112740-519
SERIAL NO: GROUP ART UNIT:
FILED: EXAMINER:
INTERNATIONAL APPLICATION NO.: PCT/DE00/02602
INTERNATIONAL FILING DATE 03 August 2000
INVENTION: METHOD FOR PROVIDING A PERMANENTLY
AVAILABLE NARROWBAND DATA LINK

Assistant Commissioner for Patents,
Washington, D.C. 20231

10

Sir:

Please amend the above-identified International Application before entry
into the National stage before the U.S. Patent and Trademark Office under 35
U.S.C. §371 as follows:

15 **In the Specification:**

Please replace the Specification of the present application, including the
Abstract, with the following Substitute Specification:

SPECIFICATION

TITLE OF THE INVENTION

20

METHOD FOR PROVIDING A PERMANENTLY AVAILABLE
NARROWBAND DATA LINK

BACKGROUND OF THE INVENTION

25

The present invention relates to a method for providing a permanently
available narrowband data link for transmitting data between a subscriber terminal
and a data network linked to a digital telephone exchange of a public telephone
network.

In this method, the following network constellation shown in Figure 1 is used as a basis:

Figure 1 shows a communication network which includes a public telephone network PSTN and a data network DN; e.g., the Internet. The connection between the public telephone network and the data network DN is established via an access point AP. This access point exhibits a connection, for example via at least one dial-up connection via the public telephone network PSTN or, respectively, via a signaling channel via the signaling network SN, e.g., CCS7, of the public telephone network or, respectively, via a switched virtual connection via a packet-switched network PN, e.g., X.25, to a digital telephone exchange EXCH of the public telephone network. The digital telephone exchange is connected to subscriber terminals CPE of various types, e.g., a PC or, respectively, a telephone.

When a subscriber to the public telephone network wishes to set up a data connection to the data network, e.g., DN, via his/her subscriber terminal, e.g., CPE, a connection is currently switched via a digital telephone exchange, e.g., EXCH, to a modem of an access point, e.g., AP. In this arrangement, a constant transmission bandwidth is available to the subscriber for transmitting data. In the case of an analog subscriber access, the transmission rate is currently 56 kbit/s maximum. In the case of an ISDN subscriber access without channel multiplexing, a transmission rate of currently 64 kbit/s can be used for transmitting data.

This procedure is disadvantageous in that the subscriber cannot automatically be informed about any events which have occurred in the data network, e.g., the arrival of electronic mail, since there is no connection to the data network. To be able to interrogate events which have occurred, e.g., electronic mail, the subscriber must first establish a dial-up connection to an access point, e.g., AP, via his/her subscriber terminal; e.g., a personal computer. The connection set-up, for which signaling of the communication partner, synchronization of the modems involved and authorization processes are necessary, consumes a large amount of time.

In addition, a dial-up connection must be switched via at least one digital telephone exchange of the public telephone network for each session of the subscriber with a computer of the data network which takes an above-average length of time due to the downloading of extensive data from the computer to the subscriber terminal in comparison with conventional telephone calls. As a result, the resources needed for data and call connections in the digital telephone exchanges or the public telephone network, respectively, are occupied for a very long time.

In addition, the available transmission rate of 56 kbit/s or, respectively, 64 kbit/s is not always necessary for transmitting the data from the data network to the subscriber terminal so that basically too much transmission bandwidth is being used.

In conjunction with an ISDN subscriber access, the subscriber can be provided within the ISDN D channel with a permanent X.25 data link via the public telephone network to the Internet with the aid of the so-called "Always On/Dynamic ISDN" technique (see e.g., A. Kuzma, "Always On/Dynamic ISDN Network Architecture Prepared for the VIA Technical Committee", White Paper December 1996, <http://www.via-isdn.org/aodi/aodiwhitepap.htm>). The subscriber is, thus, continuously informed about events in the Internet and can add one or more B channels if he/she requires a higher transmission bandwidth to the Internet.

In the case of an analog subscriber access, the occurrence of an event in the Internet, e.g., the arrival of electronic mail, can only be signaled to the subscriber at present with the aid of the feature "E-mail Waiting Indication" provided by a digital telephone exchange, which is described on page 14 of a Siemens AG customer brochure "EWSD Internode Connect Your Net to the Web" with the order number A50001-N2-P87-1-7600, 1998. According to this feature, the arrival of electronic mail is indicated to the subscriber; e.g., via a message on a display or a voice announcement on his/her subscriber terminal. To be able to read the electronic mail, however, he/she must exclusively set up a dial-up connection to an access point to the Internet. In addition, the "E-mail Waiting Indication" feature is only suitable for the e-mail service. Other types of non e-mail-related events such

as, e.g., short messages (weather and sports messages etc.) cannot be signaled via this feature. In addition, the provision of this feature presupposes that a telephone exchange of the telephone network has a connection to an e-mail server.

Furthermore, a method is known from the document WO 99 25095 A, which provides a virtual connection to remote devices in a network without the devices being constantly connected to the network. For this purpose, the network is monitored in order to detect a request from a second computer for accessing a first computer. The first computer is informed about the request with the aid of a so-called "out-band" signal, e.g., DTMF, and the "out-band" signal is then interrupted. After that, the system waits for the first computer which establishes a connection to the network. A request of the first computer for the network connection is finally accepted. Expressed in other words, a remote device which is not connected to the network is requested to set up a connection to the network automatically. As distinct from the "E-mail Waiting Indication" feature, the subscriber, after the arrival of electronic mail has been signaled, does not actively need to set up a connection to an e-mail server and this is instead performed automatically by the subscriber terminal.

However, this procedure does not eliminate the aforementioned disadvantage since at least one user channel must be set up for transmitting the data from an e-mail server to the subscriber terminal. This uses up resources in the digital telephone exchanges of the public telephone network for the long occupation times initially mentioned.

From the document EP A 0 684 741 A1, a telecommunication system is known which includes a unit for being able to signal service information without the requirement of occupying a user channel. This "user-channel-less" signaling takes place in conjunction with IN (Intelligent Network) services requested by a service control point. However, the execution of the IN services requires user channel occupation so that this approach cannot be used for providing the abovementioned data link between a subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network.

In view of the fact that there are more analog subscriber accesses than ISDN subscriber accesses by far worldwide, the previous approaches for the subscriber having an analog subscriber access are inadequate solutions.

5 An object of the present invention is, therefore, to develop a method for providing a subscriber to a public telephone network, who has an analog subscriber access, with access to a data network whilst saving as many resources as possible and without using a user channel via the telephone network.

SUMMARY OF THE INVENTION

10 The subject matter of the present invention is a method for providing a permanently available narrowband data link for transmitting data between a subscriber terminal of an analog subscriber access within a public telephone network and a data network linked to a digital telephone exchange. In this method, the data link is provided in such a manner that the public telephone network does not need to switch a user channel connection between the subscriber terminal and
15 the data network.

Among other things, this entails the advantage that the subscriber line between the subscriber terminal and the telephone exchange is not "occupied". The subscriber can, thus, receive a call at any time and make calls himself/herself, and at the same time, a narrowband data link to the data network is available to him/her
20 during a call connection.

The subscriber can request services of the data network via such a narrowband permanent and bidirectional data link, e.g., reading and processing electronic mail, or executing applications which only need a small transmission bandwidth. In addition, the subscriber has the benefit of being informed about the
25 events which have occurred in the data network, e.g., the receipt of electronic mail, and being able to respond immediately to the events which have occurred without a time-consuming connection set-up procedure to the data network. Conversely, it is also possible for the subscriber himself/herself to request services such as, e.g., a fast interrogation of a telephone directory from the data network without first
30 having to set up a connection to the data network.

In this arrangement, the narrowband permanently available data link is not switched through by a telephone exchange but uses signaling methods used on analog connecting lines or transmission methods which are usually used in mobile networks, in such a manner that it becomes possible to transmit data without
 5 occupying scarce resources in one or more digital telephone exchanges or user channels in the public telephone network, respectively.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

10 BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows the network constellation explained initially, to which the method according to the present invention can be applied.

DETAILED DESCRIPTION OF THE INVENTION

To be able to provide the narrowband permanently available data link, the
 15 following transmission techniques are used in the sections, subdivided as follows, of the entire data link between the access point AP to the data network and the subscriber terminal CPE:

A) Section between the digital telephone exchange EXCH and the access point AP.

20 There are various possibilities for providing a narrowband permanent data link for the section between the digital telephone exchange EXCH and the access computer AP:

1. In this section, the data are transmitted via a virtual data link of a data network, e.g., PN, in the form of an X.25 network or in the form of an IP-
 25 based packet-switched network which, as shown in Figure 1, connects the access point AP to the digital telephone exchange EXCH.
2. A signaling channel of the signaling network, e.g., SN in the form of a CCS7 network, of the public telephone network is used for transmitting the data, which is temporarily not used for transmitting signaling information
 30 but for transmitting the data between the telephone exchange EXCH and the access point AP.

3. The data are transmitted in this section via at least one switched dial-up connection via which IP data packets can be transmitted.
 4. The functions of the access point AP are integrated in the area of an access unit of the digital telephone exchange EXCH. Thus, within the digital telephone exchange, the access units for connecting subscriber terminals communicate with the access unit in which the functions of the access point are integrated via exchange-specific internal messages; e.g., so-called reports. These internal messages can be used for transmitting the data.
- 5
- B) Section between the subscriber terminal CPE and the digital telephone exchange EXCH
- 10

In this section, a distinction must be made between two directions of transmission:

1. Direction of transmission from the digital telephone exchange EXCH to the subscriber terminal CPE:
- 15
- To transmit the data between the digital telephone exchange and the subscriber terminal, the so-called "On-hook data transmission" or "Off-hook data transmission", respectively, can be used which is described in greater detail in the standard ETS 300 659 Parts 1 and 2. This method allows data to be transmitted at a transmission rate of 1200 bit/s in this section even if there is no switched telephone connection. The data are transmitted in the form of FSK (Frequency Shift Keyed) signals. In this arrangement, the FSK signals can be generated within the digital telephone exchange, either in a special access unit equipped with such functions or in the access unit to which the subscriber terminal is connected.
- 20

For this purpose, the subscriber terminal must be equipped with a detector which detects the corresponding FSK signals even if there is no connection. If there is a connection, this detector must be designed in such a manner that it can separate voice and data signals. In addition, it should be able to suppress the reproduction of an FSK signal at the telephone receiver when such a signal arrives, for example.

25

2. Direction of transmission from the subscriber terminal CPE to the digital telephone exchange EXCH:

The "On-hook data transmission" and "Off-hook data transmission" methods also can be used in this case.

5 In the "On-hook" state, the subscriber terminal must first produce a loop closure before it transmits the data in the direction of the digital telephone exchange.

In the "Off-hook" state, the subscriber terminal switches off the loudspeaker, if present, during the transmission of the data and must interrupt a
10 switched voice connection for a short time, if necessary.

In return, the access units of the digital telephone exchange must be constructed in such a manner that they detect the transmission of the data in the form of FSK or DTMF signals.

In the case where the data are transmitted in the form of DTMF signals,
15 attention must be paid to the fact that the transmission rate is currently restricted to approximately 30 bit/s.

When the method described above is applied, known transmission methods and facilities within the subscriber terminal or, respectively, within the digital telephone exchange can be advantageously used for executing it. Within the
20 telephone exchange, such facilities can be located either in an access unit for connecting the subscriber terminal, e.g., CPE, or in a special access unit equipped with the appropriate functions. If a special access unit is used, a transmission channel is switched for a short time by the switching network present in the telephone exchange during the transmission of the data.

25 As an alternative, it is possible for corresponding data transmission devices, e.g., modems for generating and detecting data signals, e.g., FSK, not to be integrated in the access area of the exchange but in the access points. In this case, a connection from the subscriber terminal is switched for a short time to a data transmission device in the access point by the exchange for transmitting the data.
30 This entails the advantage that no signaling information needs to be exchanged between the exchange and the access point. In addition, this does not require a data

3. The Analog Display Service Interface Protocol, which, for example, is explained in "Analog Display Services (ADSI) Interface Guide", Bellcore Document SR 2727, Bell Communications Research, 1996, also can be used for transmitting the data between the subscriber terminal and the access point to the data network. This protocol allows subscribers to access extended information and features via their terminal by providing bidirectional data communication between a terminal and a local server.
4. It also is conceivable to use different protocols in the sections between the subscriber terminal and the access point to the data network. Thus, for example, a gateway function is integrated in the digital telephone exchange. This gateway function converts, e.g., the ADSI protocol used in the section between the subscriber terminal and the digital telephone exchange to a WAP protocol, and conversely, which is used in the section between the digital telephone exchange and the access point to the data network or, respectively, a server of a service provider which exists in the data network.

D) Simple subscriber terminals with little computing power and restricted storage capacity

To provide for communication between a computer of a service provider within the data network and a simple subscriber terminal with little computing power and restricted storage capacity, the functions of a "browser" normally running in the subscriber terminal are integrated in the access point to the data network. That is to say, the access point handles the processing and displaying of the data. The subscriber terminal then only needs to be equipped with terminal functions and a low-capacity memory. The access point only transmits into the memory of the subscriber terminal text data and formatting instructions in order to display the text data stored in the memory; for example, on a display of the subscriber terminal.

E) Exemplary applications

The following services can be achieved by providing a narrowband permanent data link:

ABSTRACT OF THE DISCLOSURE

A permanently available narrowband data link for transmitting data between the subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network is provided for a subscriber terminal connected in an analog fashion to a digital telephone exchange, wherein it is not necessary for the public telephone network to switch a user channel for the data link.

5

In the claims:

On page 13, cancel line 1, and substitute the following left-hand justified heading therefor:

CLAIMS

5 Please cancel claims 1-16, without prejudice, and substitute the following claims therefor:

17. A method for providing a narrowband data link for transmitting data between a subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network, the method comprising the steps of:

10 connecting the subscriber terminal in analog to the digital telephone exchange; and

 providing the narrowband data link to the subscriber terminal as a permanently available data link.

15 18. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the step of providing a virtual data link via a separate data network for transmitting the data between an access unit existing in the digital telephone exchange for connecting the subscriber terminal and an access point to the data network.

20 19. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the step of providing a signaling channel via the public telephone network for transmitting the data between an access unit existing in the digital telephone exchange for connecting the subscriber terminal and an
25 access point to the data network.

 20. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the step of providing at least one switched dial-up connection, via which IP data packets can be transmitted, for transmitting
30 the data between an access unit existing in the digital telephone exchange for connecting the subscriber terminal and an access point to the data network.

21. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the step of integrating functions of an access point to the data network in an area of an access unit of the digital telephone exchange.

22. A method for providing a narrowband data link as claimed in Claim 21, the method further comprising the step of transmitting the data between an access unit for connecting the subscriber terminal and the access unit which exhibits the functions of the access point via internal messages within the digital telephone exchange.

23. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted as dual-tone multi-frequency signals from the subscriber terminal to the digital telephone exchange.

24. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted as frequency shift keying signals from the subscriber terminal to the digital telephone exchange.

25. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted as frequency shift keying signals from the digital telephone exchange to the subscriber terminal.

26. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the steps of:

adding and terminating a user channel, as a result of at least one of a request and a transmission bandwidth needed, between the subscriber terminal and an access point to the data network via the digital telephone exchange.

27. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted between the subscriber terminal and the data network by using TCP/IP and HTTP protocols and an HTML description language.

5

28. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted between the subscriber terminal and an access point to the data network using a wireless application protocol.

10

29. A method for providing a narrowband data link as claimed in Claim 17, wherein the data are transmitted between the subscriber terminal and an access point to the data network using an analog display service interface protocol.

15

30. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the steps of:

connecting the digital telephone exchange to a gateway computer; and
converting, via the gateway computer, the data format of the data, originating from the subscriber terminal and subsequently transmitted, into a data format according to one of a TCP/IP protocol and a wireless application protocol.

20

31. A method for providing a narrowband data link as claimed in Claim 30, the method further comprising the step of converting, via the gateway computer, the data format of the data, originating from the data network and subsequently transmitted, by one of the TCP/IP protocol and the wireless application protocol into a data format according to at least one of frequency shift keying signals and an analog display service interface protocol.

25

32. A method for providing a narrowband data link as claimed in Claim 17, the method further comprising the steps of:

30

transmitting text data from an access point to the data network into a memory of the subscriber terminal; and

transmitting formatting instructions for displaying the text data stored in the memory to the subscriber terminal.

REMARKS

5 The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned
10 **“Version With Markings To Show Changes Made”**.

 In addition, the present amendment cancels original claims 1-16 in favor of new claims 17-32. Claims 17-32 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-16 in order to present those claims in accordance with preferred United States Patent
15 Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 U.S.C. §§101, 102, 103 or 112. Indeed, the cancellation of claims 1-16 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims
20 1-16.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



(Reg. No. 39,056)

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VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

In The Specification:

The Specification of the present application, including the Abstract, has been amended as follows:

5 Description

SPECIFICATION

~~Method For Providing A Permanently Available Narrowband Data Link~~

TITLE OF THE INVENTION

METHOD FOR PROVIDING A PERMANENTLY AVAILABLE

10

NARROWBAND DATA LINK

BACKGROUND OF THE INVENTION

The present invention relates to a method for providing a permanently available narrowband data link for transmitting data between a subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network.

15

In this method, the following network constellation shown in ~~the figure~~ Figure 1 is used as a basis:

~~The figure~~ Figure 1 shows a communication network which ~~comprises~~ includes a public telephone network PSTN and a data network DN; e.g., the Internet. The connection between the public telephone network and the data network DN is established via an access point AP. This access point exhibits a connection, for example ~~by means of~~ via at least one dial-up connection via the public telephone network PSTN or, respectively, ~~by means of~~ via a signaling channel via the signaling network SN, e.g., CCS7, of the public telephone network or, respectively, ~~by means of~~ via a switched virtual connection via a packet-switched network PN, e.g., X.25, to a digital telephone exchange EXCH of the public telephone network. The digital telephone exchange is connected to subscriber terminals CPE of various types, e.g., a PC or, respectively, a telephone.

25

When a subscriber to the public telephone network wishes to set up a data connection to the data network, e.g., DN, ~~by means of~~ via his/her subscriber terminal, e.g., CPE, a connection is currently switched via a digital telephone

30

exchange, e.g., EXCH, to a modem of an access point, e.g., AP. In this arrangement, a constant transmission bandwidth is available to the subscriber for transmitting data. In the case of an analog subscriber access, the transmission rate is currently 56 kbit/s maximum. In the case of an ISDN subscriber access without
 5 channel multiplexing, a transmission rate of currently 64 kbit/s can be used for transmitting data.

This procedure is disadvantageous in that the subscriber cannot automatically be informed about any events which have occurred in the data network, e.g., the arrival of electronic mail, since there is no connection to the data
 10 network. To be able to interrogate events which have occurred, e.g., electronic mail, the subscriber must first establish a dial-up connection to an access point, e.g., AP, ~~by means of~~ via his/her subscriber terminal; e.g., a personal computer. The connection set-up, for which signaling of the communication partner, synchronization of the modems involved and authorization processes are necessary,
 15 consumes a large amount of time.

In addition, a dial-up connection must be switched via at least one digital telephone exchange of the public telephone network for each session of the subscriber with a computer of the data network which takes an above-average length of time due to the downloading of extensive data from ~~said~~ the computer to
 20 the subscriber terminal in comparison with conventional telephone calls. As a result, the resources needed for data and call connections in the digital telephone exchanges or the public telephone network, respectively, are occupied for a very long time.

In addition, the available transmission rate of 56 kbit/s or, respectively, 64
 25 kbit/s is not always necessary for transmitting the data from the data network to the subscriber terminal so that basically too much transmission bandwidth is being used.

In conjunction with an ISDN subscriber access, the subscriber can be provided within the ISDN D channel with a permanent X.25 data link via the public
 30 telephone network to the Internet with the aid of the so-called "Always On/Dynamic ISDN" technique (see e.g., A. Kuzma, "Always On/Dynamic ISDN

Furthermore, a method is known from the document WO 99 25095 A, which provides a virtual connection to remote devices in a network without the devices being constantly connected to the network. For this purpose, the network is monitored in order to detect a request from a second computer for accessing a first computer. The first computer is informed about the request with the aid of a so-called "out-band" signal, e.g., DTMF, and the "out-band" signal is then interrupted. After that, the system waits for the first computer which establishes a connection to the network. A request of the first computer for the network connection is finally accepted. Expressed in other words, a remote device which is not connected to the network is requested to set up a connection to the network automatically. As distinct from the "E-mail Waiting Indication" feature, the subscriber, after the arrival of electronic mail has been signaled, does not actively need to set up a

connection to an e-mail server and this is instead performed automatically by the subscriber terminal.

However, this procedure does not eliminate the aforementioned disadvantage since at least one user channel must be set up for transmitting the data
5 from an e-mail server to the subscriber terminal. This uses up resources in the digital telephone exchanges of the public telephone network for the long occupation times initially mentioned.

From the document EP A 0 684 741 A1, a telecommunication system is known which ~~comprises~~ includes a unit for being able to signal service information
10 without the requirement of occupying a user channel. This "user-channel-less" signaling takes place in conjunction with IN (Intelligent Network) services requested by a service control point. However, the execution of the IN services requires user channel occupation so that this approach cannot be used for providing the abovementioned data link between a subscriber terminal and a data network
15 linked to a digital telephone exchange of a public telephone network.

In view of the fact that there are more analog subscriber accesses than ISDN subscriber accesses by far worldwide, the previous approaches for the subscriber having an analog subscriber access are inadequate solutions.

One An object of the present invention is ~~now~~, therefore, to develop a
20 method for providing a subscriber to a public telephone network, who has an analog subscriber access, with access to a data network whilst saving as many resources as possible and without using a user channel via the telephone network.

~~This object is achieved by the means specified in claim 1. Other advantageous embodiments of the invention are specified in subclaims.~~

25 SUMMARY OF THE INVENTION

The subject matter of the present invention is a method for providing a permanently available narrowband data link for transmitting data between a subscriber terminal of an analog subscriber access within a public telephone network and a data network linked to a digital telephone exchange. In this method,
30 the data link is provided in such a manner that the public telephone network does

BRIEF DESCRIPTION OF THE FIGURES

~~The figure~~ Figure 1 shows the network constellation explained initially, to which the method according to the present invention can be applied.

DETAILED DESCRIPTION OF THE INVENTION

5 To be able to provide the narrowband permanently available data link, the following transmission techniques are used in the sections, subdivided as follows, of the entire data link between the access point AP to the data network and the subscriber terminal CPE:

10 A) Section between the digital telephone exchange EXCH and the access point AP.

There are various possibilities for providing a narrowband permanent data link for the section between the digital telephone exchange EXCH and the access computer AP:

1. In this section, the data are transmitted via a virtual data link of a data network, e.g., PN, in the form of an X.25 network or in the form of an IP-based packet-switched network which-, as shown in ~~the figure~~ Figure 1, connects the access point AP to the digital telephone exchange EXCH.
2. A signaling channel of the signaling network, e.g., SN in the form of a CCS7 network, of the public telephone network is used for transmitting the data, which is temporarily not used for transmitting signaling information but for transmitting the data between the telephone exchange EXCH and the access point AP.
3. The data are transmitted in this section via at least one switched dial-up connection via which IP data packets can be transmitted.
- 25 4. The functions of the access point AP are integrated in the area of an access unit of the digital telephone exchange EXCH. Thus, within the digital telephone exchange, the access units for connecting subscriber terminals communicate with the access unit in which the functions of the access point are integrated ~~by means of~~ via exchange-specific internal messages; e.g., so-called reports. These internal messages can be used for transmitting the data.
- 30

B) Section between the subscriber terminal CPE and the digital telephone exchange EXCH

In this section, a distinction must be made between two directions of transmission:

- 5 1. Direction of transmission from the digital telephone exchange EXCH to the subscriber terminal CPE:

To transmit the data between the digital telephone exchange and the subscriber terminal, the so-called "On-hook data transmission" or "Off-hook data transmission", respectively, can be used which is described in greater detail in the
10 standard ETS 300 659 Parts 1 and 2. This method allows data to be transmitted at a transmission rate of 1200 bit/s in this section even if there is no switched telephone connection. The data are transmitted in the form of FSK (Frequency Shift Keyed) signals. In this arrangement, the FSK signals can be generated within the digital telephone exchange, either in a special access unit equipped with such functions or
15 in the access unit to which the subscriber terminal is connected.

For this purpose, the subscriber terminal must be equipped with a detector which detects the corresponding FSK signals even if there is no connection. If there is a connection, this detector must be designed in such a manner that it can separate voice and data signals. In addition, it should be able to suppress the
20 reproduction of an FSK signal at the telephone receiver when such a signal arrives, for example.

2. Direction of transmission from the subscriber terminal CPE to the digital telephone exchange EXCH:

The "On-hook data transmission" and "Off-hook data transmission"
25 methods ~~can~~ also can be used in this case.

In the "On-hook" state, the subscriber terminal must first produce a loop closure before it transmits the data in the direction of the digital telephone exchange.

In the "Off-hook" state, the subscriber terminal switches off the
30 loudspeaker, if present, during the transmission of the data and must interrupt a switched voice connection for a short time, if necessary.

In return, the access units of the digital telephone exchange must be constructed in such a manner that they detect the transmission of the data in the form of FSK or DTMF signals.

5 In the case where the data are transmitted in the form of DTMF signals, attention must be paid to the fact that the transmission rate is currently restricted to ~~approx.~~ approximately 30 bit/s.

When the method described above is applied, known transmission methods and facilities within the subscriber terminal or, respectively, within the digital telephone exchange can be advantageously used for executing it. Within the
10 telephone exchange, such facilities can be located either in an access unit for connecting the subscriber terminal, e.g., CPE, or in a special access unit equipped with the appropriate functions. If a special access unit is used, a transmission channel is switched for a short time by the switching network present in the telephone exchange during the transmission of the data.

15 As an alternative, it is possible for corresponding data transmission devices, e.g., modems for generating and detecting data signals, e.g., FSK, not to be integrated in the access area of the exchange but in the access points. In this case, a connection from the subscriber terminal is switched for a short time to a data transmission device in the access point by the exchange for transmitting the data.
20 This entails the advantage that no signaling information needs to be exchanged between the exchange and the access point. In addition, this does not require a data link, e.g., via X.25, between the exchange and the access point. Furthermore, software adaptations in the system or application software of the exchange can be saved.

25 In the section between the telephone exchange and the subscriber terminal, the known CLIP method, for example, which is usually used in the case where the directory number of the calling subscriber is indicated, can be used as transmission method. To suppress the "ringing" at the subscriber end, the subscriber terminal should recognize from the number of the calling access point that this is a data link,
30 and deal with the call in a suitable manner before the "ringing".

An appropriate addition to the method according to the present invention consists in that, after a request by the subscriber or depending on the transmission bandwidth needed for the transmission of the data, a user channel can be additionally added or disconnected in the section between the subscriber terminal
 5 and the access point. The connection set-up of the additional user channel can be accelerated by, for example, dispensing with another authentication of the subscriber.

C) Protocols

The following standardized protocols can be used for transmitting the data
 10 via the narrowband permanent data link between the subscriber terminal CPE and the data network DN:

1. For accessing the Internet as data network, the TCP/IP protocols and the HTTP protocol using them, and the description language HTML are used.
2. In the mobile radio area there are already approaches (see, e.g., "Wireless
 15 Application Protocol" Architecture Specification, Wireless Application Protocol Forum, 1998) which provide access to the Internet with the aid of the so-called wireless application protocol, a restricted variant of HTML and HTTP, for mobile stations. This WAP protocol ~~can~~ also can be used for transmitting the data via the narrowband permanent data link in the
 20 fixed network. This ensures that the Internet servers for service providers which are adapted to the WAP protocol are also available for access via the narrowband permanent data link.
3. The Analog Display Service Interface Protocol, which, for example, is explained in "Analog Display Services (ADSI) Interface Guide", Bellcore
 25 Document SR 2727, Bell Communications Research, 1996, ~~can~~ also can be used for transmitting the data between the subscriber terminal and the access point to the data network. This protocol allows subscribers to access extended information and features via their terminal by providing bidirectional data communication between a terminal and a local server.
- 30 4. It also is conceivable to use different protocols in the sections between the subscriber terminal and the access point to the data network. Thus, for

example, a gateway function is integrated in the digital telephone exchange. This gateway function converts, e.g., the ADSI protocol used in the section between the subscriber terminal and the digital telephone exchange to a WAP protocol, and conversely, which is used in the section between the digital telephone exchange and the access point to the data network or, respectively, a server of a service provider which exists in the data network.

D) Simple subscriber terminals with little computing power and restricted storage capacity

To provide for communication between a computer of a service provider within the data network and a simple subscriber terminal with little computing power and restricted storage capacity, the functions of a "browser" normally running in the subscriber terminal are integrated in the access point to the data network. That is to say, the access point handles the processing and displaying of the data. The subscriber terminal then only needs to be equipped with terminal functions and a low-capacity memory. The access point only transmits into the memory of the subscriber terminal text data and formatting instructions in order to display the text data stored in the memory; for example, on a display of the subscriber terminal.

E) Exemplary applications

The following services can be ~~realized~~ achieved by providing a narrowband permanent data link:

1. News service: after dialing a service number or after menu-controlled selection of the service by the subscriber, the subscriber is registered for the service. The subscriber terminal of the subscriber then always receives via the permanent data link current news such as, e.g., market prices, weather forecasts, sports news etc., which are displayed on the display of the subscriber terminal.
2. "E-mail Indication": the subscriber registers by dialing a service number for the "E-mail Indication" service. Immediately after it arrives in a so-called mailbox in the Internet, the electronic mail is forwarded to its subscriber terminal and stored in its memory.

~~Method for providing a permanently available narrowband data link~~

ABSTRACT OF THE DISCLOSURE

5 A permanently available narrowband data link for transmitting data between the subscriber terminal (~~CPE~~) and a data network (~~DN~~) linked to a digital telephone exchange (~~EXCH~~) of a public telephone network is provided for a subscriber terminal (~~CPE~~) connected by in an analog ~~means~~ fashion to a digital telephone exchange. ~~In this arrangement, wherein~~ it is not necessary for the public telephone network to switch a user channel for the data link.

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Description

Method for providing a permanently available narrowband data link

5

The invention relates to a method for providing a permanently available narrowband data link for transmitting data between a subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network.

10

In this method, the following network constellation shown in the figure is used as a basis:

15 The figure shows a communication network which comprises a public telephone network PSTN and a data network DN, e.g. the Internet. The connection between the public telephone network and the data network DN is established via an access point AP. This access point

20 exhibits a connection, for example by means of at least one dial-up connection via the public telephone network PSTN or, respectively, by means of a signaling channel via the signaling network SN, e.g. CCS7, of the public telephone network or, respectively, by means of a

25 switched virtual connection via a packet-switched network PN, e.g. X.25, to a digital telephone exchange EXCH of the public telephone network. The digital telephone exchange is connected to subscriber terminals CPE of various types, e.g. a PC or, respectively, a

30 telephone.

When a subscriber to the public telephone network wishes to set up a data connection to the data network, e.g. DN, by means of his subscriber terminal, e.g. CPE,

35 a connection is currently switched via a digital telephone exchange, e.g. EXCH, to a modem of an access point, e.g. AP. In this arrangement, a constant

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transmission bandwidth is available to the subscriber for transmitting data. In the case of an analog subscriber access, the transmission rate is

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currently 56 kbit/s maximum. In the case of an ISDN subscriber access without channel multiplexing, a transmission rate of currently 64 kbit/s can be used for transmitting data.

5

This procedure is disadvantageous in that the subscriber cannot automatically be informed about any events which have occurred in the data network, e.g. the arrival of electronic mail, since there is no
10 connection to the data network. To be able to interrogate events which have occurred, e.g. electronic mail, the subscriber must first establish a dial-up connection to an access point, e.g. AP, by means of his subscriber terminal, e.g. a personal computer. The
15 connection set-up, for which signaling of the communication partner, synchronization of the modems involved and authorization processes are necessary, consumes a large amount of time.

20 In addition, a dial-up connection must be switched via at least one digital telephone exchange of the public telephone network for each session of the subscriber with a computer of the data network which takes an above-average length of time due to the downloading of
25 extensive data from said computer to the subscriber terminal in comparison with conventional telephone calls. As a result, the resources needed for data and call connections in the digital telephone exchanges or the public telephone network, respectively, are
30 occupied for a very long time.

In addition, the available transmission rate of 56 kbit/s or, respectively, 64 kbit/s is not always necessary for transmitting the data from the data
35 network to the subscriber terminal so that basically too much transmission bandwidth is being used.

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to the Internet with the aid of the so-called "Always On/Dynamic ISDN" technique (see e.g. A. Kuzma, "Always On/Dynamic ISDN Network Architecture Prepared for the VIA Technical Committee", White Paper December 1996, <http://www.via-isdn.org/aodi/aodiwhitepap.htm>). The subscriber is thus continuously informed about events in the Internet and can add one or more B channels if he requires a higher transmission bandwidth to the Internet.

10

In the case of an analog subscriber access, the occurrence of an event in the Internet, e.g. the arrival of electronic mail, can only be signaled to the subscriber at present with the aid of the feature "E-mail Waiting Indication" provided by a digital telephone exchange, which is described on page 14 of a Siemens AG customer brochure "EWSD Internode Connect Your Net to the Web" with the order number A50001-N2-P87-1-7600, 1998. According to this feature, the arrival of electronic mail is indicated to the subscriber, e.g. by means of a message on a display or a voice announcement on his subscriber terminal. To be able to read the electronic mail, however, he must exclusively set up a dial-up connection to an access point to the Internet. In addition, the "E-mail Waiting Indication" feature is only suitable for the e-mail service. Other types of non e-mail-related events such as, e.g. short messages (weather and sports messages etc.) cannot be signaled by means of this feature. In addition, the provision of this feature presupposes that a telephone exchange of the telephone network has a connection to an e-mail server.

Furthermore, a method is known from the document WO 99 25095 A, which provides a virtual connection to remote devices in a network without the devices being

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for accessing a first computer. The first computer is informed about the request with the aid of a so-called "out-band" signal, e.g. DTMF, and the "out-band" signal is then interrupted. After that, the system waits for the first computer which establishes a connection to the network. A request of the first computer for the network connection is finally accepted. Expressed in other words, a remote device which is not connected to the network is requested to set up a connection to the network automatically. As distinct from the "E-mail Waiting Indication" feature, the subscriber, after the arrival of electronic mail has been signaled, does not actively need to set up a connection to an e-mail server and this is instead performed automatically by the subscriber terminal.

However, this procedure does not eliminate the aforementioned disadvantage since at least one user channel must be set up for transmitting the data from an e-mail server to the subscriber terminal. This uses up resources in the digital telephone exchanges of the public telephone network for the long occupation times initially mentioned.

From the document EP A 0 684 741 A1, a telecommunication system is known which comprises a unit for being able to signal service information without the requirement of occupying a user channel. This "user-channel-less" signaling takes place in conjunction with IN (Intelligent Network) services requested by a service control point. However, the execution of the IN services requires user channel occupation so that this approach cannot be used for providing the abovementioned data link between a subscriber terminal and a data network linked to a digital telephone exchange of a public telephone network.

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In view of the fact that there are more analog subscriber accesses than ISDN subscriber accesses by far worldwide, the previous approaches for the subscriber having an analog subscriber access are
5 inadequate solutions.

One object of the invention is now to develop a method for providing a subscriber to a public telephone network, who has an analog subscriber access, with
10 access to a data network whilst saving as many resources as possible and without using a user channel via the telephone network.

This object is achieved by the means specified in claim
15 1. Other advantageous embodiments of the invention are specified in subclaims.

The subject matter of the invention is a method for providing a permanently available narrowband data link
20 for transmitting data between a subscriber terminal of an analog subscriber access within a public telephone network and a data network linked to a digital telephone exchange. In this method, the data link is provided in such a manner that the public telephone
25 network does not need to switch a user channel connection between the subscriber terminal and the data network.

Among other things, this entails the advantage that the
30 subscriber line between the subscriber terminal and the telephone exchange is not "occupied". The subscriber can thus receive a call at any time and make calls himself, and at the same time, a narrowband data link to the data network is available to him during a call
35 connection.

(Musical notation continues)

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The subscriber can request services of the data network via such a narrowband permanent and bidirectional data link, e.g. reading and processing electronic mail, or executing applications which only need a small transmission bandwidth. In addition, the subscriber has the benefit of being informed about the events which have occurred in the data network, e.g. the receipt of electronic mail,

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There are various possibilities for providing a narrowband permanent data link for the section between the digital telephone exchange EXCH and the access computer AP:

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1. In this section, the data are transmitted via a virtual data link of a data network, e.g. PN, in the form of an X.25 network or in the form of an IP-based packet-switched network which - as shown in the figure - connects the access point AP to the digital telephone exchange EXCH.
2. A signaling channel of the signaling network, e.g. SN in the form of a CCS7 network, of the public telephone network is used for transmitting the data, which is temporarily not used for transmitting signaling information but for transmitting the data between the telephone exchange EXCH and the access point AP.
3. The data are transmitted in this section via at least one switched dial-up connection via which IP data packets can be transmitted.
4. The functions of the access point AP are integrated in the area of an access unit of the digital telephone exchange EXCH. Thus, within the digital telephone exchange, the access units for connecting subscriber terminals communicate with the access unit in which the functions of the access point are integrated by means of exchange-specific internal messages, e.g. so-called reports. These internal messages can be used for transmitting the data.
- B) Section between the subscriber terminal CPE and the digital telephone exchange EXCH

In this section, a distinction must be made between two directions of transmission:

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1. Direction of transmission from the digital telephone exchange EXCH to the subscriber terminal CPE:

5 To transmit the data between the digital telephone exchange and the subscriber terminal, the so-called "On-hook data transmission" or "Off-hook data transmission", respectively, can be used which is described in greater detail in the standard ETS 300 659
10 Parts 1 and 2. This method allows data to be transmitted at a transmission rate of 1200 bit/s in this section even if there is no switched telephone connection. The data are transmitted in the form of FSK (Frequency Shift Keyed) signals. In this arrangement,
15 the FSK signals can be generated within the digital telephone exchange, either in a special access unit equipped with such functions or in the access unit to which the subscriber terminal is connected.

20 For this purpose, the subscriber terminal must be equipped with a detector which detects the corresponding FSK signals even if there is no connection. If there is a connection, this detector must be designed in such a manner that it can separate
25 voice and data signals. In addition, it should be able to suppress the reproduction of an FSK signal at the telephone receiver when such a signal arrives, for example.

30 2. Direction of transmission from the subscriber terminal CPE to the digital telephone exchange EXCH:

The "On-hook data transmission" and "Off-hook data
35 transmission" methods can also be used in this case.

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In the "Off-hook" state, the subscriber terminal switches off the loudspeaker, if present, during the transmission of the data and must interrupt a switched voice connection for a short time, if necessary.

5

In return, the access units of the digital telephone exchange must be constructed in such a manner that they detect the transmission of the data in the form of FSK or DTMF signals.

10

In the case where the data are transmitted in the form of DTMF signals, attention must be paid to the fact that the transmission rate is currently restricted to approx. 30 bit/s.

15

When the method described above is applied, known transmission methods and facilities within the subscriber terminal or, respectively, within the digital telephone exchange can be advantageously used for executing it. Within the telephone exchange, such facilities can be located either in an access unit for connecting the subscriber terminal, e.g. CPE, or in a special access unit equipped with the appropriate functions. If a special access unit is used, a transmission channel is switched for a short time by the switching network present in the telephone exchange during the transmission of the data.

As an alternative, it is possible for corresponding data transmission devices, e.g. modems for generating and detecting data signals, e.g. FSK, not to be integrated in the access area of the exchange but in the access points. In this case, a connection from the subscriber terminal is switched for a short time to a data transmission device in the access point by the exchange for transmitting the data. This entails the

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advantage that no signaling information needs to be
exchanged

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between the exchange and the access point. In addition, this does not require a data link, e.g. via X.25, between the exchange and the access point. Furthermore, software adaptations in the system or application
5 software of the exchange can be saved.

In the section between the telephone exchange and the subscriber terminal, the known CLIP method, for example, which is usually used in the case where the
10 directory number of the calling subscriber is indicated, can be used as transmission method. To suppress the "ringing" at the subscriber end, the subscriber terminal should recognize from the number of the calling access point that this is a data link, and
15 deal with the call in a suitable manner before the "ringing".

An appropriate addition to the method according to the invention consists in that, after a request by the
20 subscriber or depending on the transmission bandwidth needed for the transmission of the data, a user channel can be additionally added or disconnected in the section between the subscriber terminal and the access point. The connection set-up of the additional user
25 channel can be accelerated by, for example, dispensing with another authentication of the subscriber.

C) Protocols

30 The following standardized protocols can be used for transmitting the data via the narrowband permanent data link between the subscriber terminal CPE and the data network DN:

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1. For accessing the Internet as data network, the TCP/IP protocols and the HTTP protocol using them, and the description language HTML are used.
- 5 2. In the mobile radio area there are already approaches (see e.g. "Wireless Application Protocol" Architecture Specification, Wireless Application Protocol Forum, 1998) which provide access to the Internet with the aid of the so-called wireless application protocol, a restricted
10 variant of HTML and HTTP, for mobile stations. This WAP protocol can also be used for transmitting the data via the narrowband permanent data link in the fixed network. This ensures that
15 the Internet servers for service providers which are adapted to the WAP protocol are also available for access via the narrowband permanent data link.
- 20 3. The Analog Display Service Interface Protocol, which, for example, is explained in "Analog Display Services (ADSI) Interface Guide", Bellcore Document SR 2727, Bell Communications Research, 1996, can also be used for transmitting the data
25 between the subscriber terminal and the access point to the data network. This protocol allows subscribers to access extended information and features via their terminal by providing bidirectional data communication between a terminal and a local server.
30
4. It also conceivable to use different protocols in the sections between the subscriber terminal and the access point to the data network. Thus, for example, a gateway function is integrated in the
35 digital telephone exchange. This gateway function

converts, e.g. the ADSI protocol used in the section between the subscriber terminal and the digital telephone exchange to a WAP protocol, and conversely, which is used in the section between

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the digital telephone exchange and the access point to the data network or, respectively, a server of a service provider which exists in the data network.

5

D) Simple subscriber terminals with little computing power and restricted storage capacity

To provide for communication between a computer of a service provider within the data network and a simple subscriber terminal with little computing power and restricted storage capacity, the functions of a "browser" normally running in the subscriber terminal are integrated in the access point to the data network. That is to say the access point handles the processing and displaying of the data. The subscriber terminal then only needs to be equipped with terminal functions and a low-capacity memory. The access point only transmits into the memory of the subscriber terminal text data and formatting instructions in order to display the text data stored in the memory, for example on a display of the subscriber terminal.

E) Exemplary applications

25

The following services can be realized by providing a narrowband permanent data link:

1. News service: after dialing a service number or after menu-controlled selection of the service by the subscriber, the subscriber is registered for the service. The subscriber terminal of the subscriber then always receives via the permanent data link current news such as, e.g. market prices, weather forecasts, sports news etc., which are displayed on the display of the subscriber terminal.

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2. "E-mail Indication": the subscriber registers by dialing a service number for the "E-mail Indication" service. Immediately after it arrives in a so-called mailbox in the Internet, the electronic mail is forwarded to its subscriber terminal and stored in its memory.

When the subscriber dials a service number in order to register for a service, dialing the service number does not lead to a switched connection being set up via the digital telephone exchange of the public telephone network to an access point to the data network. Instead, the service number is transmitted in the direction of the access point via the permanent data link explained above.

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Patent Claims

1. A method for providing a narrowband data link for transmitting data between a subscriber terminal (CPE) and a data network (DN) linked to a digital telephone exchange of a public telephone network, characterized in that the narrowband data link is provided to the subscriber terminal (PE) which is connected by analog means to the digital telephone exchange as permanently available data link.
2. The method as claimed in claim 1, characterized in that a virtual data link is provided via a separate data network (PN) for transmitting the data between the access unit existing in the digital telephone exchange (EXCH) for connecting the subscriber terminal (CPE) and an access point (AP) to the data network (DN).
3. The method as claimed in claim 1, characterized in that a signaling channel is provided via the public telephone network (PSTN) for transmitting the data between the access unit existing in the digital telephone exchange (EXCH) for connecting the subscriber terminal (CPE) and an access point (AP) to the data network (DN).
4. The method as claimed in claim 1, characterized in that at least one switched dial-up connection, via which IP data packets can be transmitted, is provided for transmitting the data between the access unit existing in the digital telephone exchange (EXCH) for connecting the subscriber terminal (CPE) and an access point (AP) to the data network (DN).

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5. The method as claimed in claim 1, characterized in that the functions of the access point (AP) to the data network (DN) are integrated in the area of an access unit of the digital telephone exchange (EXCH).
6. The method as claimed in claim 5 characterized in that the data are transmitted between an access unit for connecting the subscriber terminal (CPE) and the access unit which exhibits the functions of the access point, by means of internal messages within the digital telephone exchange (EXCH).
7. The method as claimed in one of the preceding claims characterized in that the data are transmitted in the form of DTMF (Dual-tone Multi-Frequency) signals from the subscriber terminal (CPE) to the digital telephone exchange (EXCH).
8. The method as claimed in one of claims 1 to 6, characterized in that the data are transmitted in the form of frequency shift keying signals from the subscriber terminal (CPE) to the digital telephone exchange (EXCH).
9. The method as claimed in one of the preceding claims, characterized in that the data are transmitted in the form of frequency shift keying signals from the digital telephone exchange (EXCH) to the subscriber terminal (CPE).
10. The method as claimed in one of the preceding claims, characterized in that, after a request and/or depending on the transmission bandwidth needed, a user channel can be additionally added and terminated between the subscriber terminal (CPE) and the access point (AP)

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via the digital telephone exchange (EXCH).

11. The method as claimed in one of the preceding
claims, characterized in that the data are
5 transmitted between the subscriber terminal (CPE)
and the data network (DN) by using the TCP/IP and
HTTP protocols and the HTML description language.
12. The method as claimed in one of claims 1 to 10,
10 characterized in that the data are transmitted
between the subscriber terminal (CPE) and the
access point (AP) to the data network (DN) by
using the wireless application protocol.
13. The method as claimed in one of claims 1 to 10,
15 characterized in that the data are transmitted
between the subscriber terminal (CPE) and the
access point (AP) to the data network (DN) by
using the analog display service interface
20 protocol.
14. The method as claimed in one of claims 1 to 10,
25 characterized in that the digital telephone
exchange (EXCH) is connected to a gateway computer
which converts the data format of the data
originating from the subscriber terminal (CPE) and
transmitted by means of DTMF signals or by means
of frequency shift keying signals and/or by means
30 of the analog display service interface protocol,
into the data format according to the TCP/IP
protocol or the wireless application protocol.
15. The method as claimed in claim 14, characterized
35 in that the gateway computer connected to the
digital telephone exchange (EXCH) converts the
data format of the data originating from the data
network (DN) and transmitted by means of the

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TCP/IP protocol or the wireless application
protocol

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into the data format according to the frequency shift keying signals and/or the analog display service interface protocol.

- 5 16. The method as claimed in one of the preceding
claims, characterized in that text data are
transmitted from the access point (AP) to the data
network (DN) into a memory of the subscriber
terminal (CPE) and formatting instructions for
10 displaying the text data stored in the memory are
transmitted to the subscriber terminal (CPE).

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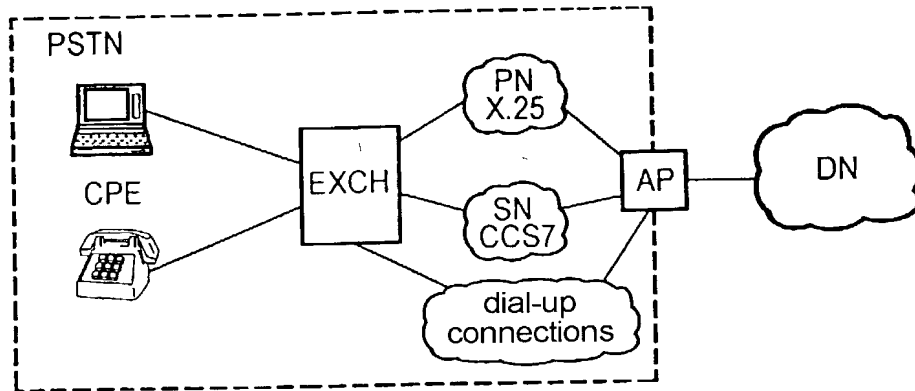
Abstract

Method for providing a permanently available narrowband data link

A permanently available narrowband data link for transmitting data between the subscriber terminal (CPE) and a data network (DN) linked to a digital telephone exchange (EXCH) of a public telephone network is provided for a subscriber terminal (CPE) connected by analog means to a digital telephone exchange. In this arrangement, it is not necessary for the public telephone network to switch a user channel for the data link.

Figure

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Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren zur Bereitstellung einer permanent verfügbaren schmalbandigen Datenverbindung

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☒ am 03.08.2000 als

PCT internationale Anmeldung

PCT Anmeldungsnummer PCT/DE00/02602

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that.

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Method for providing a permanent low speed data connection

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 03.08.2000 as

PCT international application

PCT Application No. PCT/DE00/02602

and was amended on _____ (if applicable)

im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

19937708.1
(Number)
(Nummer)

DE
(Country)
(Land)

10.08.1999
(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/02602
(Application Serial No.)
(Anmeldeseriennummer)

03.08.2000
(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

anhängig
(Status)
(patentiert, anhängig,
aufgegeben)

pending
(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M; J)

(Status)
(patentiert, anhängig,
aufgeben)

(Status)
(patented, pending,
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer anführen)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)



29177

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I hereby appoint

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(Name und Telefonnummer)

Direct Telephone Calls to: (name and telephone number)

Ext. _____

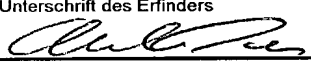
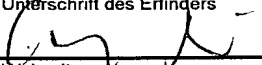
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1-00 Voller Name des einzigen oder ursprünglichen Erfinders: Dr. CHANDAN DAS	Full name of sole or first inventor. Dr. CHANDAN DAS
Unterschrift des Erfinders  14. Feb. 02 14.02.02	Inventor's signature Date
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2-00 Voller Name des zweiten Miterfinders (falls zutreffend): Dr. CORNEL KLEIN	Full name of second joint inventor, if any: Dr. CORNEL KLEIN
Unterschrift des Erfinders  Datum 6. Feb. 02	Second inventor's signature Date
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(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).